

REDUCING THE SPREAD OF INVASIVE EXOTIC PLANTS FOLLOWING FIRE IN WESTERN FORESTS, DESERTS, AND GRASSLANDS

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ABSTRACT

Wildland fire is a natural process that often helps to maintain or improve the health and productivity of native plant communities. However, when invasive exotic plants (hereafter, weeds) are involved, fires burn in an unnatural situation. There are 2 purposes to this presentation: (1) to show how weeds often proliferate following wildland fire, and (2) to discuss how reducing post-fire weed spread is one of the best ways to keep relatively uninfested land from becoming seriously infested. Various plants respond differently to fire. However, all too often, weeds rapidly infest burned areas, frequently causing vast and permanent damage. Therefore the intent of this presentation is to increase the awareness about this problem along with providing some management recommendations—with every intention to support appropriate prescribed fire efforts.

Factors like an ideal seed bed, reduced or eliminated competition from native plants and increased nutrients released by the fire, all combine to make conditions ideal for weed seed to germinate and flourish following fire. There are approximately 28 million hectares of noxious weeds on private, state, and federal wildlands in 11 western states (outside of Alaska). Weeds spread to relatively uninfested land by wind, water, wildlife, livestock, people, and equipment, including fire control equipment. Therefore, following wildland fire in a previously uninfested area, there is a high likelihood for both ideal conditions for weed establishment and the presence of weed seed. Furthermore, biennial and perennial weeds, already present in the fire area, commonly sprout from buds or crowns. Squarrose knapweed (*Centaurea virgata*), diffuse knapweed (*Centaurea diffusa*), and rush skeletonweed (*Chondrilla juncea*), for example, often resprout, flower, and set seed within 6 weeks of a fire—while most other vegetation is dormant awaiting another season to produce seed. Quick seed production following fire gives weeds an advantage over native plant species.

Invasive exotic weeds arrive in the U.S. without the insects, pathogens, and diseases that kept them in balance with other vegetation in their native areas. Furthermore, as mentioned earlier, many of the weeds promptly resprout following fire and quickly produce seed a full season ahead of most native plants. These factors allow weeds to be very aggressive. Consequently weeds are spreading at about 1,860 ha/day on federal lands alone in the western U.S. (outside of Alaska). Fortunately, approximately 90% of these western federal lands are not yet significantly infested. The overarching goal, therefore, becomes keeping relatively uninfested land from becoming seriously infested with weeds. Capitalizing on the opportunity to prevent weed spread after both prescribed and wildfires is one of the most cost effective and efficient ways to meet that goal.

For both prescribed and wildfire management, at least the following 10 considerations are recommended: (1) At the earliest possible time, preferably before the fire season, ensure that the National Environmental Policy Act (NEPA) Process is adequate to cover timely application of herbicides if needed anywhere on the landscape. The proper process needs to be in place so that an environmental analysis update, amendment, or other documentation does not unduly delay the application of herbicides after a fire. (2) Establish procedures that prevent the transport of weeds into or within a wildfire or burned area. For example, require cleaning of equipment and pack animals. Avoid staging equipment, supplies, or camps in weed-infested areas. (3) Delineate noxious weed infestations and erect barriers to prevent spread from those areas. (4) Include existing, or consider involving new cooperators. Weed management efforts have a higher probability of success when adjacent landowners, public land users, agencies, universities, or other interested parties are participating. (5) After fires, when weeds begin to sprout from seed or from crowns or roots of existing plants, there frequently are outstanding opportunities to control them. Weeds are usually easier to find for hand control or other mechanical techniques, and herbicide application is more effective because weeds are no longer protected by non-target vegetation or debris. Capitalize on this rare opportunity before the weeds have a chance to produce seed. In a research example from northern Utah, wildfire increased squarrose knapweed abundance by 50 to 120% within just 2 years. Control of squarrose knapweed from herbicide applied during the first fall after a summer burn was 98–100% effective, while the same herbicide treatment achieved only 20% control or less in adjacent non-burned areas (Dewey et al. 2000). Thus, invasive weeds can increase dramatically after a fire and post-fire herbicide application is a unique window of opportunity for effective control. (6) Build the cost to control weeds caused or encouraged by the disturbance of the fire into fire rehabilitation plans. (7) Where rehabilitation plans are not intended, employ creativity and perseverance to ensure that invasive weeds get the priority they deserve. (8) Use only weed-free seed and mulch in revegetation. (9) Approximately 1 month after any fire, survey the entire fire area for signs of new or sprouting weeds. Use of Global Positioning System recorders can facilitate follow-up or missed treatments in subsequent years. Repeated surveys will be needed, with the frequency and intensity

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guided by local conditions. (10) Develop and implement a strategy to control weeds, including follow-up detection and treatments for a few years, until the populations are completely controlled or eradicated.

While planning prescribed burns evaluate the potential for increased weed populations and consider the following: (1) Check existing weed maps and visit with local weed experts. Then survey the entire proposed burn area for weeds. If a few weeds have been on the site for 1 year or more it is likely that thousands of unseen seeds are in the ground ready to germinate. (2) Check adjacent land for weeds that may become a seed source following the burn. These areas may provide weed seed to the burn area via transport by people, livestock, wildlife, wind, water, vehicles, or other equipment. (3) Enlist the advice of agency weed coordinators, extension agents, U.S. Department of Agriculture, or county weed supervisors regarding plans to minimize the increase in weeds. Where possible, time the burn to reduce seed production of existing weeds. (4) Make sure that equipment, vehicles, and personnel do not bring weed seed in with them from other areas. (5) Ensure that the appropriate NEPA process and requirements for weed control are addressed before the fire to avoid any delays in timely application of herbicides in the event they are needed. When preparing NEPA documents, keep in mind the urgency of controlling weeds following fire before they have a chance to set seed.

In conclusion, we must keep relatively uninfested land from becoming seriously infested. Fires are often very beneficial; weeds are not beneficial. Any negative impacts from fire are usually short-term, whereas impacts from weeds are long-term and often permanent. Future generations of Americans deserve to inherit healthy productive wildlands, not vast landscapes infested with noxious weeds that are unfit for people or wildlife.

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